region.

2. The method of claim 1 wherein said non-destructively observing comprises magnetic resonance imaging or magnetic resonance spectroscopy.

3. The method of claim 1 wherein the medical device is guided to said region of a patient using non-destructive observation.

4. The method of claim 1 wherein said medical device is positioned within said region of a patient using non-destructive observation to assist in the positioning.

5. (AMENDED) The method of claim 1 wherein said cell viability is indicated by a property resulting from an event selected from the group consisting of cell activity, cell inactivity, cell growth, cell death, specific cell function, specific cell dysfunction, cell volume homeostasis, cell acid-base homeostasis , cell fluid-electrolyte homeostasis, volumetric expansion of cell population, and volumetric decrease of cell population.

6. (AMENDED) The method of claim 2 wherein said cell viability is indicated by a property resulting from an event selected from the group consisting of cell activity, cell inactivity, cell growth, cell death, specific cell function, cell volume homeostasis, cell acid-base homeostasis, cell fluid-electrolyte homeostasis, specific cell dysfunction, volumetric expansion of cell population, and volumetric decrease of cell population.

7. (AMENDED) The method of claim 1 wherein said property is monitored by observation of at least one parameter selected from the group consisting of local [and regional] lactate levels, local [and regional] glucose turnover, local [and regional] phosphorous high-energy metabolite concentrations, and local [and regional] F-19 labeled metabolites, extracellular Na 23 concentration, and [changes in the] conversion rates of O_2 gas to H_2O water.

8. (AMENDED) The method of claim 2 wherein said property is monitored by

observation of at least one parameter selected from the group consisting of local [and regional] lactate levels, local [and regional] glucose turnover, local [and regional] phosphorous high-energy metabolite concentrations, and local [and regional] F-19 labeled metabolites, extracellular Na 23 concentration, and [changes in the] conversion rates of O_2 gas to H_2O water.

9. (AMENDED) The method of claim 6 wherein said property is monitored by observation of at least one parameter selected from the group consisting of local [and regional] lactate levels, local [and regional] glucose turnover, local [and regional] phosphorous high-energy metabolite concentrations, and local [and regional] F-19 labeled metabolites, extracellular Na 23 concentration, and [changes in the] conversion rates of O_2 gas to H_2O water.

10. The method of claim 1 wherein said property is monitored by at least one technique selected from the group consisting of proton H1 magnetic resonance spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

11. The method of claim 2 wherein said property is monitored by at least one technique selected from the group consisting of proton magnetic resonance spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

12. The method of claim 6 wherein said property is monitored by at least one technique selected from the group consisting of proton magnetic resonance spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of

local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

13. The method of claim 1 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

14. The method of claim 2 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

15. The method of claim 9 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

16. The method of claim 12 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

17. The method of claim 1 wherein said property comprises blood flow or perfusion, or changes in blood flow or perfusion, as local vascular supply is developed.

18. The method of claim 2 wherein said property comprises blood flow or perfusion, or changes in blood flow or perfusion, as vascular supply is developed.

19. The method of claim 7 wherein said property comprises blood flow or perfusion, or changes in blood flow or perfusion, as vascular supply is developed.

20. The method of claim 17 wherein blood flow or perfusion, or changes in blood flow or perfusion, are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-

shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

21. The method of claim 18 wherein blood flow or perfusion, or changes in blood flow or perfusion, are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

22. The method of claim 19 wherein blood flow or perfusion, or changes in blood flow or perfusion, are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

23. The method of claim 2 wherein said property comprises anisotropic water diffusion.

24. The method of claim 2 wherein said property comprises the local concentrations of at least one of choline, NAA, GABA, phosphocholine, and creatine.

25. The method of claim 1 wherein the property is selected from the group consisting of a) local tissue density and cell populations, b) local electrical activity, c) local oxygenated/deoxygenated hemoglobin and changes in the local T2* reflecting the alterations in tissue oxygenation, d) changes in the vascular reserve and response to oxygenation stresses, e) tissue fluorescence and bioluminescence, f) tissue fluorescence and bioluminescence, g) electrical impedance, and h) local tissue temperature.

26. The method of claim 1 wherein the property is selected from the group consisting of a) local tissue density and cell populations, b) local electrical activity, c) local oxygenated/deoxygenated hemoglobin and changes in the local T2* reflecting the alterations in tissue oxygenation, d) changes in the vascular reserve and response to

oxygenation stresses, e) tissue fluorescence and bioluminescence, f) tissue fluorescence and bioluminescence, g) electrical impedance, and h) local tissue temperature.

27. (AMENDED) A method for indicating viability of implanted stem cells, progenitor cells, or differentiated cells, [cells] said method being performed with a medical device that supports at least one sensing function comprising:

non-destructively observing a region of a patient to where stem cells, progenitor cells, or differentiated cells have been implanted ;

sensing a property within said region of a patient that is indicative of cell metabolism;

repeating or continuing said sensing of a property over a period of time in which said property changes; and

using data from sensing changes in said property within said region to indicate cell viability from an implant of stem cells, progenitor cells, or differentiated cells [with] within the region.

28. The method of claim 27 wherein said data from sensing changes in said property indicates active metabolic function in implanted cells.

29. The method of claim 28 wherein changes in said property are monitored by at least one technique selected from the group consisting of proton H1 magnetic resonance spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

PLEASE ADD THE FOLLOWING NEW CLAIMS:

30. A method for indicating viability of implanted transfected stem cells, transfected progenitor cells, or transfected differentiated cells, the method being performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where transfected cells have

been implanted;

sensing a property within said region of a patient that is indicative of cell viability or inviability of implanted, transfected cells; and

using data from sensing said property within said region to indicate cell viability from an implant of transfected cells within the region.

31. The method of claim 31 wherein the transfected cells are grown in a culture prior to implanting.

32. A method for indicating viability of implanted , transfected cells, said method being performed with a medical device that supports at least one sensing function comprising:

non-destructively observing a region of a patient to where transfected cells grown in a culture have been implanted;

sensing a property within said region of a patient that is indicative of cell metabolism;

repeating or continuing said sensing of a property over a period of time in which said property changes; and

using data from sensing changes in said property within said region to indicate cell viability from an implantof transfected cells grown in a culture within the region.

33. A method for indicating viability of stem cells, progenitor cells, or differentiated cells implanted into tissue, the method being performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where cells have been implanted into tissue;

sensing a property within said region of a patient that is indicative of cell viability or inviability of cells implanted into tissue; and

using data from sensing said property within said region to indicate cell viability from within the region.

34. A method for indicating viability of an implanted colony of cells, the method being

performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where a colony of cells have been implanted;

sensing a property within said region of a patient that is indicative of cell viability or inviability of the implanted colony of cells; and

using data from sensing said property within said region to indicate cell viability from the implanted colony of cells within the region.

35. The method of claim 34 wherein the colony of cells comprise transfected cells.

36. The method of claim 35 wherein the colony of transfected cells have been cultured prior to being implanted.

37. The method of claim 34 wherein an image from the sensing is viewed within 5 minutes of sensing.

38. The method of claim 34 wherein an image from sensing is viewed in near real time.

39. The method of claim 35 wherein an image from sensing is viewed in near real time.

40. The method of claim 36 wherein an image from sensing is viewed in near real time.

41. The method of claim 34 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

42. The method of claim 35 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony ofcells is used to quantitate the cell viability.

43. The method of claim 36 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted cells is used to quantitate the cell viability.

47. The method of claim 37 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

48. The method of claim 39 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

49. The method of claim 30 wherein said property within said region of a patient comprises anisotropic water diffusion.

REMARKS CONCERNING THE AMENDMENTS

The above amendments have been made in an effort to more clearly define the present invention. Antecedent basis for the amendments are found generally in the specification and in particular in original claims 1 and 27, and pages 29, lines 3-1; claim 13 finds antecedent basis on page 15, lines 11-14; etc.

The amendment to claim of additional events indicative of cell viability finds antecedent basis generally in the specification and, for example, on pages 14 and 15, in the description of the figures, and pages 20-22.

The limitations of claims 34-40 may be found generally in the specification and, for example, in original claim 1, page 20, lines 4-17 (for the implantation of a colony of cells); the Examples on pages 28-29 for viewing an image within 5 minutes of sensing; page 30, lines 1-6 (for near real time viewing of sensing); the quantitating of claims 41-47 is shown on page 13, lines 25-31; etc.

Clean copy of claims in accordance with 37 CFR 1.121.

A1

1. A method for indicating viability of implanted stem cells, progenitor cells, or differentiated cells, the method being performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where stem cells, progenitor cells, or differentiated cells have been implanted;

sensing a property within said region of a patient that is indicative of cell viability or lack of viability of implanted stem cells, progenitor cells, or differentiated cells ; and

using data from sensing said property within said region to indicate cell viability from an implant of stem cells, progenitor cells, or differentiated cells within the region.

2. The method of claim 1 wherein said non-destructively observing comprises magnetic resonance imaging.

3. The method of claim 1 wherein the medical device is guided to said region of a patient using non-destructive observation.

4. The method of claim 1 wherein said medical device is positioned within said region of a patient using non-destructive observation to assist in the positioning.

5. The method of claim 1 wherein said cell viability is indicated by a property resulting from an event selected from the group consisting of cell activity, cell inactivity, cell growth, cell death, specific cell function, specific cell dysfunction, volumetric expansion of cell population, and volumetric decrease of cell population.

6. The method of claim 2 wherein said cell viability is indicated by a property resulting from an event selected from the group consisting of cell activity, cell inactivity, cell growth, cell death, specific cell function, specific cell dysfunction, volumetric expansion

of cell population, and volumetric decrease of cell population.

7. The method of claim 1 wherein said property is monitored by observation of at least one parameter selected from the group consisting of local lactate levels, local glucose turnover, local phosphorous high-energy metabolite concentrations, local F-19 labeled metabolites, alterations in tissue sodium, and changes in the conversion rates of O_2 gas to H_2O water.

8. The method of claim 2 wherein said property is monitored by observation of at least one parameter selected from the group consisting of local lactate levels, local glucose turnover, local phosphorous high-energy metabolite concentrations, local F-19 labeled metabolites, alterations in tissue sodium, and changes in the conversion rates of O_2 gas to H_2O water.

9. The method of claim 6 wherein said property is monitored by observation of at least one parameter selected from the group consisting of local lactate levels, local glucose turnover, local phosphorous high-energy metabolite concentrations, local F-19 labeled metabolites, alterations in tissue sodium, and changes in the conversion rates of O_2 gas to H_2O water.

10. The method of claim 1 wherein said property is monitored by at least one technique selected from the group consisting of proton spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

11. The method of claim 2 wherein said property is monitored by at least one technique selected from the group consisting of proton spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

12. The method of claim 6 wherein said property is monitored by at least one technique selected from the group consisting of proton spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

13. The method of claim 1 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

14. The method of claim 2 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

15. The method of claim 9 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

16. The method of claim 12 wherein said medical device includes at least one element selected from the group consisting of a volume coil surrounding the tissue and a local multi-tuned MRI RF coil.

17. The method of claim 1 wherein said property comprises blood flow or changes in blood flow as vascular supply is developed.

18. The method of claim 2 wherein said property comprises blood flow or changes in blood flow as vascular supply is developed.

19. The method of claim 7 wherein said property comprises blood flow or changes in

blood flow as vascular supply is developed.

20. The method of claim 17 wherein blood flow or changes in blood flow are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

21. The method of claim 18 wherein blood flow or changes in blood flow are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

22. The method of claim 19 wherein blood flow or changes in blood flow are measured by observation of at least one material selected from the group consisting of labeled H_2O water, contrast-agent infusion of TI-shortening agents or T2*-shortening agents, local introduction of hyperpolarized Xenon gas, or optically-active coloring agents.

23. The method of claim 2 wherein said property comprises anisotropic water diffusion.

24. The method of claim 2 wherein said property comprises the local concentrations of at least one of choline, NAA, GABA, phosphocholine, and creatine.

25. The method of claim 1 wherein the property is selected from the group consisting of a) local tissue density and cell populations, b) local electrical activity, c) local oxygenated/deoxygenated hemoglobin and changes in the local T2* reflecting the alterations in tissue oxygenation, d) changes in the vascular reserve and response to oxygenation stresses, e) tissue fluorescence and bioluminescence, f) tissue fluorescence and bioluminescence, g) electrical impedance, and h) local tissue temperature.

26. The method of claim 1 wherein the property is selected from the group consisting of a) local tissue density and cell populations, b) local electrical activity, c) local

oxygenated/deoxygenated hemoglobin and changes in the local T2* reflecting the alterations in tissue oxygenation, d) changes in the vascular reserve and response to oxygenation stresses, e) tissue fluorescence and bioluminescence, f) tissue fluorescence and bioluminescence, g) electrical impedance, and h) local tissue temperature.

27. A method for indicating viability of implanted stem cells, progenitor cells, or differentiated cells, said method being performed with a medical device that supports at least one sensing function comprising:

non-destructively observing a region of a patient to where stem cells, progenitor cells, or differentiated cells have been implanted ;

sensing a property within said region of a patient that is indicative of cell metabolism;

repeating or continuing said sensing of a property over a period of time in which said property changes; and

using data from sensing changes in said property within said region to indicate cell viability from an implant of stem cells, progenitor cells, or differentiated cells within the region.

28. The method of claim 27 wherein said data from sensing changes in said property indicates active metabolic function in transplanted cells.

29. The method of claim 28 wherein changes in said property are monitored by at least one technique selected from the group consisting of proton spectroscopy, monitoring of C-13 labeled glucose, monitoring by P-31 MR spectroscopy, monitoring of local F-19 labeled metabolites, monitoring of Na-23 levels, and monitoring of $17O_2$ gas conversion to H_217O water.

30. A method for indicating viability of implanted transfected stem cells, transfected progenitor cells, or transfected differentiated cells, the method being performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where transfected cells have

been implanted;

sensing a property within said region of a patient that is indicative of cell viability or inviability of implanted, transfected cells; and

using data from sensing said property within said region to indicate cell viability from an implant of transfected cells within the region.

31. The method of claim 31 wherein the transfected cells are grown in a culture prior to implanting.

32. A method for indicating viability of implanted , transfected cells, said method being performed with a medical device that supports at least one sensing function comprising:

non-destructively observing a region of a patient to where transfected cells grown in a culture have been implanted;

sensing a property within said region of a patient that is indicative of cell metabolism;

repeating or continuing said sensing of a property over a period of time in which said property changes; and

using data from sensing changes in said property within said region to indicate cell viability from an implantof transfected cells grown in a culture within the region.

33. A method for indicating viability of stem cells, progenitor cells, or differentiated cells implanted into tissue, the method being performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where cells have been implanted into tissue;

sensing a property within said region of a patient that is indicative of cell viability or inviability of cells implanted into tissue; and

using data from sensing said property within said region to indicate cell viability from within the region.

34. A method for indicating viability of an implanted colony of cells, the method being

performed with a medical device that supports at least one sensing function, the method comprising:

non-destructively observing a region of a patient to where a colony of cells have been implanted;

sensing a property within said region of a patient that is indicative of cell viability or inviability of the implanted colony of cells; and

using data from sensing said property within said region to indicate cell viability from the implanted colony of cells within the region.

35. The method of claim 34 wherein the colony of cells comprise transfected cells.

36. The method of claim 35 wherein the colony of transfected cells have been cultured prior to being implanted.

37. The method of claim 34 wherein an image from the sensing is viewed within 5 minutes of sensing.

38. The method of claim 34 wherein an image from sensing is viewed in near real time.

39. The method of claim 35 wherein an image from sensing is viewed in near real time.

40. The method of claim 36 wherein an image from sensing is viewed in near real time.

41. The method of claim 34 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

42. The method of claim 35 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony ofcells is used to quantitate the cell viability.

43. The method of claim 36 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted cells is used to quantitate the cell viability.

The method of claim 37 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

48. The method of claim 39 wherein the sensing of a property within said region of a patient that is indicative of cell viability or lack of viability of the implanted colony of cells is used to quantitate the cell viability.

49. The method of claim 30 wherein said property within said region of a patient comprises anisotropic water diffusion.